Inhalation Therapy

JOURNAL OF THE
AMERICAN ASSOCIATION
OF
INHALATION THERAPISTS

JUNE 1955 VOL. 4 NO. 3

(Advertisement)

ARE YOUR PATIENTS GETTING THE OXYGEN CONCENTRATION PRESCRIBED?

AUTOMATIC CONTROL UNIT DEVELOPED BY O.E.M. CORPORATION

Recent medical research has emphasized the importance of accurately controlling oxygen concentration in oxygen tents.

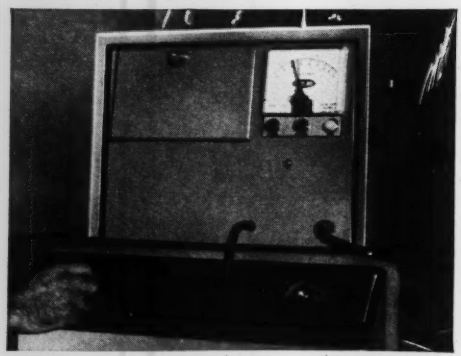
Retrolental Fibroplasia in infants and respiratory acidosis in older patients with pulmonary fibrosis are often caused by indiscriminate use of high oxygen concentrations. On the other hand, high concentrations of 50% to 60% are imperative for many cardiac patients. Research not yet published will point out the need to administer oxygen in controlled dosage like any drug.

CURRENT OXYGEN CONTROL METHODS UNSATISFACTORY

Control of oxygen concentrations in tents has always been difficult, requiring frequent analysis with an oxygen analyzer plus constant adjustment of the flow. Many factors can affect the concentration: Leaks in the tent, poor canopy tucking, inadequate liter flows, failure to use flushing procedures. Even the most elaborate inhalation therapy department cannot afford the necessary technicians to make certain proper oxygen concentrations are maintained.

OXYGEN TENT THERAPY STILL MOST COMFORTABLE

The oxygen tent is the most comfortable method for administering long-term oxygen therapy. There are no encumbering masks, cannulae or catheters to disturb the patient. He retains freedom to move, sit up, talk and eat. Oxygen tent therapy is also the method of choice, or necessity, with delirious patients, in head wound cases and where a modulated temperature is desired during the summer.



NEW ELECTRONIC UNIT ASSURES CONSTANT OXYGEN CONTROL

The O.E.M. Corporation, leader in the development of oxygen tents, has completed a long-term research program designed to solve the oxygen control problem. Result is a new oxygen tent that maintains a preset oxygen concentration automatically, electronically, without attendance.

The desired percentage of concentration is set on a meter – just like the desired temperature. The electronic control unit automatically adjusts the flow of oxygen to maintain the prescribed concentration. This new oxygen concentration control unit, called the O.E.M. AUTOMATIC MECHANAIRE, is perhaps the most important advance in oxygen tent therapy since the tent was invented.

HOW THE CONTROL UNIT WORKS

A sample of the atmosphere under the canopy is constantly being drawn into a continuous oxygen analyzer. Every 15 seconds, the concentration is monitored. The control unit maintains the concentration within a 6% range.

When the monitor finds the concentration below the range, oxygen at 40 liters a minute is flushed into the tent. There is a visual indication that oxygen is flushing into the tent. Oxygen continues to flush into the unit until the concentration is within the preset range. When the monitor discovers this, the flow of oxygen drops to a maintenance flow of 12 liters per minute . . . visually indicated on the control panel. If the oxygen concentration rises above the desired range, maintenance flow is cut off and air is flushed into the tent to bring the concentration down.

AUTOMATIC SAFETY VALVE PROTECTS PATIENT

Note that when a lower concentration is desired, it is not achieved merely by shutting off the oxygen flow. On the O.E.M. *AUTOMATIC* MECHANAIRE, an automatic air safety valve starts drawing room air into the tent as soon as the oxygen flow drops below 6 liters per minute. There is no danger of carbon-dioxide build-up because either air or oxygen in substantial quantities is being drawn into the canopy constantly, washing out the carbon-dioxide.

CLINICAL TESTING SHOWS ADVANTAGES

Under clinical conditions, the oxygen concentration in a new O.E.M. AUTOMATIC MECHANAIRE was brought up to 50% from room air in 10 minutes by electronic control. In comparison, more than an hour was required to bring a tent up to 50% concentration at the normal flow rate of 10-12 liters per minute.

The new O.E.M. AUTOMATIC MECHANAIRE maintained a 50% oxygen concentration for a 24-hour period under clinical conditions...on the maintenance flow of 12 liters per minute 96% of the time and on the flush cycle only 4% of the time. It maintained 60% oxygen concentration under clinical conditions on the maintenance flow of 12 liters of oxygen per minute for 90% of the time . . . and on flush for 10% of the time. Conclusive evidence that the new O.E.M. AUTOMATIC MECHANAIRE can maintain high concentrations of oxygen for therapeutic purposes with an economical consumption of oxygen.

CONTROL UNIT AVAILABLE FOR MODEL #50 MECHANAIRES

The O.E.M. AUTOMATIC MECHANAIRE including tent and electronic concentration control unit sells for $1,500. The control unit alone – which fits any model #50 or #55 Mechanaire – is $850. Control units for model #30 Mechanaires and tents not manufactured by O.E.M. are available on special order at slightly higher prices.

Additional information on the new O.E.M. AUTOMATIC MECHANAIRE may be obtained by writing O.E.M. Corporation, East Norwalk, Conn.

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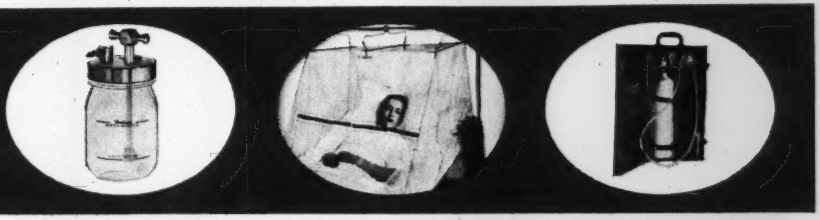

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VOL. 4 NO. 2

inhalation therapy

JUNE 1959

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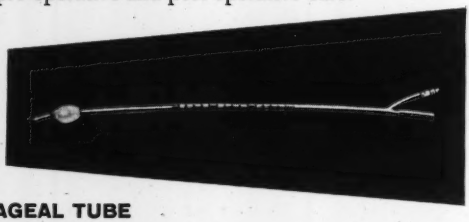
Professional Guidance...

VITAL IN THE DEVELOPMENT OF INSTRUMENTS FOR ANESTHESIA

The successful creation of new and improved anesthetic instruments is dependent, in a large measure, upon the professional guidance and active participation of the anesthesiologist.

This professional participation is vital to Davol . . . and has resulted in a great variety of effective facilitants for use in the operating room as well as for pre-operative and post-operative care.



BIZZARRI-GIUFFRIDA ENDOESOPHAGEAL TUBE

Davol technicians worked closely with Drs. Dante Bizzarri and Joseph Giuffrida to evolve effective means of intubation which would prevent the aspiration of gastric contents during anesthesia. Under their diligent supervision Davol was able to produce an endoesophageal tube with several distinctive qualities:*

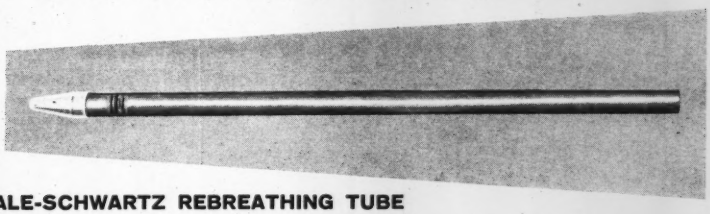
- Conscious as well as unconscious patients can be intubated.
- Esophageal balloon located just above the gastroesophageal junction is inflated to prevent regurgitation.
- If regurgitation occurs, gastric contents pass through tube. Lumen of tube permits emptying of stomach, dispelling force of vomiting. Expulsion of tube will not occur.
- Tube does not cause compression of the trachea.

* *Intubation of the Esophagus – its role in preventing aspiration pneumonia and asphyxial death. Joseph G. Giuffrida, M.D., and Dante Bizzarri, M.D., Brooklyn, New York. The American Journal of Surgery – February 1957.*

Davol has collaborated to produce other advances in the field of anesthesiology . . . for example, the maintenance of a free airway during surgery:

THE DR. SAKLAD NASOPHARYNGEAL AIRWAY

Was developed with the assistance of the Chief of the Department of Anesthesiology, Rhode Island Hospital, Providence, R. I. This instrument was designed to insure a patent nasopharyngeal airway. It is non-traumatic, made of a soft polyvinyl material, and has a special tip with a double opening. Made specifically in rights or lefts for insertion in the nares. In either case, the medial opening will permit easy passage of an aspirating catheter.



THE NEW DALE-SCHWARTZ REBREATHING TUBE

Provides an improved and simplified method of preventing post-operative atelectasis. Set consists of disposable tube and sterilizable, plastic mouthpiece. Developed in collaboration with Doctors W. Andrew Dale and Seymour I. Schwartz of the University of Rochester School of Medicine and Dentistry and Strong Memorial Hospital, the post-operative use of this tube doubles tidal volume of the average patient . . . provides hyperventilation with attending alveolar distention.**

** *Addition of Dead Space to Produce Hyperventilation for Prophyloxsis of Atelectasis. W. Andrew Dale, M.D., and Seymour I. Schwartz, M.D., Surgical Forum, Vol. VI, 1956.*

** *Dead Space Rebreathing Tube for Prevention of Atelectasis: W. Andrew Dale, M.D., Seymour I. Schwartz, M.D., and Herman Rahn, Ph. D.; Journal of the American Medical Association, April 6, 1957, Vol. 163.*

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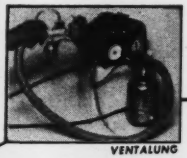

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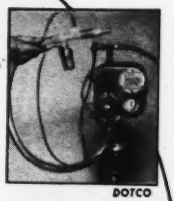

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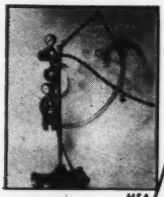

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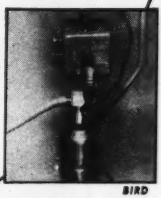

BIRD

Preoperative Recognition and Treatment of Bronchopulmonary Disease: William F. Miller, MD; J. Robert Cade, MD, and Ivan E. Cushing, MD. Anesthesiology, Vol. 18, No. 3, pp. 483-497, May-June, 1957.

Considerations in Humidification by Nebulization: Ivan Cushing, MD, and William F. Miller, MD. Diseases of the Chest, Nov. 1958, Vol. XXXIV, No. 5.

An Aerosol Method of Producing Bronchial Secretions in Human Subjects: A Clinical Technique for the Detection of Lung Cancer. Hylan Bickerman, MD, FCCP; Edith Sproul, MD, and Alvan L. Barach, MD, FCCP.

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Editorial

A Report of Progress

AS WE prepare for the AAIT's Fifth Annual Meeting and Lecture Series under our stewardship, it seems fitting to give you a progress report.

During the past five years there has been a steady growth in our membership, the number of chapters, circulation of INHALATION THERAPY, and attendance at the annual meeting.

In 1955 there were fewer than 200 members, of whom only a small group were active. Today we are approaching the more than 800-member mark.

Here is how that figure breaks down:

Members	529
Industrial Members	99
Service Members	57
Associate Members	31
Admitted and awaiting initial dues	67
Being processed	25
	808

I am sure you will agree that this growth is gratifying.

Just as encouraging is the growth which has occurred in chapter formation. Three years ago there were no chapters. Today there are 17, with others being formed throughout the United States and Canada.

Annual meeting attendance has increased. In 1956 there were 86 registrants; 1957 attendance increased to 138; and in 1958 the number climbed to 240.

We are hoping that this year, with the convention city more centrally located and with membership the highest in our history, to have an attendance of more than 300.

Another tangible indication of our growth, and of industry's interest in our ever-improving standards, is the response we get from exhibitors at the annual meeting. Last year, 21 exhibitors took 24 booths, and for the first time all exhibit space was sold. In fact, two exhibitors could not be accommodated. This November we are hoping to sell even more exhibit space.

There can be no question about our growth, nor about the increasing awareness of inhalation therapy. More and more hospitals are recognizing the need for adequately trained inhalation therapists, and are establishing separate departments of inhalation therapy.

The number of institutes, symposia, workshops, and programs devoted to inhalation therapy is increasing. Numerous hospitals are seriously considering establishing schools for training inhalation therapists, which can be accredited by competent medical authorities.

Although these various activities mean that inhalation therapy is growing up as a profession, much remains to be done.

A national registry must be established for inhalation therapists who will meet certain educational and experience standards. This will be of great significance since it will provide medically-approved national standards against which all inhalation therapists may be measured. This will, of course, help to up-grade the profession as nothing else could.

It is time for all inhalation therapists to begin thinking seriously about how they will meet these standards. Each therapist should carefully evaluate his experience and training, and should be anxious to become a more professional person. His desire for improvement, his willingness to keep on learning, his willingness to gain more experience—these are the mark of the true professional.

He should study everything on inhalation therapy—this journal, other medical journals related to the field, books, talks, tape recordings, lectures, monographs, brochures . . . everything.

He should attend every meeting possible—national, regional, state, and local. He should participate in every institute, symposium, or workshop he can get to conveniently.

Finally, he should insist upon the highest professional standards at all times, both from himself and his associates in the profession, not only in knowledge of skills and techniques, but in his relationships with other AAIT members, with his fellow workers, with the hospital staff, and, most important, with the patients in his care.

We like to think of inhalation therapy as a profession. However, it will only become and remain a profession if its members will act and work like professional people.

And when this happens with enough people and in enough places, then, and only then, will the gains of the AAIT and its members during the last five years seem like only a small beginning.

Albert Carrière
Executive Director

Post-anesthesia recovery aided by high oxygen concentrations

by Harry G. Benz, M.D.

SINCE October 1956 a new mask technique has been in almost daily use in the recovery room at Washington Hospital. Oxygen is administered to patients in concentrations upwards of 85 to 90% without respiratory embarrassment from CO_2 rebreathing or any discomfort from mask weight and fit.

Postoperative recovery has been faster and surer in cases of (1) pulmonary fibrosis, (2) anemia, (3) post-surgical shock, (4) high risk rheumatic heart disease, (5) arteriosclerosis with hypertension, (6) smoke patients, and (7) polycythemia. Definite help in preventing atelectasis in many cases is credited to the regime.

The mask involved is of very light rubber construction, with an embedded wire in the rim for easy fit; it leaves a minimum of "dead space" over the face, and provides a very short and direct path between nostrils or mouth and the exhalation port. An attachment which fits over the exhalation valve makes it possible to adjust back pressure from the exhalation port from an unmeasurable minimum (virtually zero) to approximately one, two, three or four centimeters of water. The valves at the exhalation port (left of face), inhalation port (center) and outside air inlet (right of face) are simple, of unit construction, all rubber, identical and interchangeable (see cut).

Dr. Benz is director of the department of anesthesia and the recovery room of the Washington (Pennsylvania) Hospital.

Other features simplify technique, but the fit, elimination of dead space, and low-resistance valves seem to account for the ability to maintain over 90% oxygen concentrations in a simple therapy type mask without patient anxiety. Samples drawn into a continuous oxygen analyzer from the mask during therapy verify the high concentrations attained. Our patients' relaxation and comfort document the second advantage daily.

Clinical Experience. Located as we are in coal mining and steel making country, our most frequent cases are pneumoconiosis (fibrosis, silicosis and anthracosis). For these we adjust the positive pressure valve at setting C or D (3 or 4 cm

water) to force the patient to fill out his lungs and clear the foreign matter and mucus. Five to 10 minutes of therapy with liter flows of oxygen (generally 7 or 8 lpm) just above the patient's normal respiratory volume is alternated with five minutes of no therapy—for a period of one to one and a half hours.

We attend the patient constantly, and are careful not to open the positive pressure valve rapidly. We reduce the oxygen concentration and pressure as soon as the patient's tolerance will permit. This is accomplished by adjusting the liter flow and by gradually moving from the smallest to the largest opening of the pressure control disc. After the last period of therapy by mask, we taper off with a nasal cannula. It must be remembered that pneumoconiosis patients have been subjected to high oxygen concentration anesthetics during major surgical procedures.

National Cylinder Gas Division
Chemetron Corporation

The high-concentration therapy mask with positive pressure attachment over the exhalation port for back pressures from 0 to 4 cm of water column (A to E settings) as used by Dr. Benz at Washington Hospital in Pennsylvania.

In patients with postoperative shock, anemia or polycythemia, higher flows (up to 15 lpm) and no back pressure at all, are used. After heart attacks with intractable pain, where risk is high and mask anxiety is greatest of all, to be able to administer higher concentrations of oxygen at reasonably high flows (10 to 12 lpm) without patient fright is a boon.

On arteriosclerotics with hypertension, the ability to administer high concentrations intermittently (to the degree that patients can tolerate the therapy) helps maintain better postoperative states.

Smoke patients are treated with the positive pressure setting at C or D, as in pulmonary fibrosis cases.

This mask has helped hiccough patients without histories of chronicity by intentionally sponsoring CO_2 rebreathing. This is done by using very low oxygen flows (600 to 700 cc), removing the inspiratory valve, and using the rebreathing reservoir.

Although the regime and the mask are used at Washington Hospital for recovery room work rather than floor therapy, one important floor case suggests a need for more trials of the technique. An acute coronary patient in intractable pain was terrified. Tents did not maintain adequate oxygen concentrations; a nasal catheter failed; opiates helped only slightly. This mask, set for high flows and high oxygen concentration without back pressure, was tolerated for a full hour, and all pain vanished.

Attributes and Procedure. The advantages of this type of mask

concluded on page 20

New nebulizer does not need oxygen or air compressor

by Edwin Rayner Levine, M.D.

THE increasing popularity of aerosol therapy is caused by the beneficial results obtained in a widening field of bronchopulmonary diseases.

Bronchodilator aerosol has become a common type of ambulatory treatment because of its ease of use and rapid action. Aerosols designed for humidification, soothing of irritation, relief of cough spasm, liquefaction of sputum and bronchial drainage have, on the other hand, become almost entirely hospital procedures. This is not because it is impossible or even difficult to conduct this therapy at home. Oxygen cylinders can be used easily, or air compressors are excellent and efficient when combined with any one of a number of nebulizers.

It is rather because the treatment is expensive and cumbersome, and the trouble involved does not seem justified for any except long-term and severe cases. Consequently, the bronchial patient receives proper aerosol therapy only if he is bad enough to warrant hospitalization. The asthmatic patient uses his pocket bronchodilator aerosol, and receives no other aerosol unless he is likewise in serious difficulties.

The end result is a lack of continuity and inadequate therapy, in some ways similar to a program which might provide ulcer regimes, digitalis or hormones only during the hospital stay, and would substitute general constitutional care when the patient returned home. This may sound rather extreme, but we know that when a bronchial patient has improved to the point of being able to carry on a regular routine existence again, his bronchial tubes will still show irritative changes and marked digression from normal physiological function. These are the same changes, if to a lesser degree, that were the indications for aerosol therapy in the first place. Logically, this treatment should be continued, even though

Dr. Levine is medical director, inhalation therapy department, Edgewater Hospital, Chicago, and on the AAIT Advisory Board.

the patient has left the hospital and returned to work.

Actual experience with aerosol continued in the post-hospital period bears out this idea. The acute or subacute case shows smoother and more complete improvement with less tendency to recurrence; and the chronic or long-term case reaches a much higher degree of betterment, and is also likely to remain well for a longer period. This experience, as well as careful evaluation of the hospitalized case, has suggested that greater flexibility and duration of this type of treatment is needed.

The simplest of these cases, from an aerosol therapy standpoint, is generally thought to be the asthmatic. Here a bronchodilator alone should be adequate treatment. However, we have had cases in whom pulmonary function testing before and after bronchodilators demonstrated no significant improvement, although some of these patients reported an ease of breathing for 15 or 20 minutes. The answer lies in the oft-overlooked fact that, in addition to narrowing of the bronchial lumen, there is obstruction by thick and viscid mucous secretions. This must be eliminated before important relief can be obtained, and generally some aid to evacuation is necessary.

It occurs frequently

The picture is not unusual. It is accepted as part of *status asthmaticus*, and does occur frequently in many asthmatic attacks. The patient who has his own nebulizer tends to take bronchodilator aerosol as often as he feels difficulty in respiration. We have seen people who used Isuprel or other isoproterenols every 10 or 20 minutes, day and night, for more than 24 hours. This, of course, makes a mockery of the claims of measured dosage in bronchodilator aerosols, which would not be correct even in patients who used such apparatus according to directions. There are unpleasant and even toxic reactions to such frequent utilization, which argues the need for more effective treatment and for a safer bronchodilator solution.

Without side reactions

The obvious advantages of isoproterenol led us to use a solution which was reported to be effective without the undesirable side reactions. This is 0.4% isoproterenol sulfate +2.0% phenylephrine hydrochloride in propylene glycol (trade named Nebu-Prel). In addition to the potentiating effect of phenylephrine, itself a good vasoconstrictor and anticongestant, there is a suppression of sympathomimetic action of isoproterenol, thus preventing nervousness, tachycardia, blood pressure changes, dizziness or other expected side reactions. We found Nebu-Prel to be an excellent bronchodilator without showing any adverse reaction in any of the 144 cases which we studied. This is similar to the findings of other workers who reported on approximately 500 cases. Furthermore, it was used on our service in 14 patients who were also in heart failure, eight in pulmonary edema and six in right heart failure, who improved steadily during the time they were receiving 0.3 to 0.5 cc of Nebu-Prel three to four times a day. This wide range of safety and exceptional effectiveness made it possible to treat all patients needing bronchodilators, and to allow

continued on page 24

A heritage and a renaissance await you along the Schuylkill

by David Marshall

HISTORY is alive in Philadelphia.

That's why during the Fifth Annual Meeting and Lecture Series of the American Association of Inhalation Therapists at the Benjamin Franklin Hotel there – November 16 - 20 – you'll have time to see "The Cradle of Liberty."

Nearly every evening will be free and one afternoon will be set aside for you to go exploring. You can see Independence Hall, complete with Liberty Bell, just four blocks from the hotel. In fact, within walking distance of our convention headquarters are these historical sites:

Congress Hall, which served as the national capital from 1790 to 1800. Here George Washington was inaugurated for his second term as President.

Betsy Ross House where in 1776 Mrs. Ross was commissioned by Washington, Robert Morris and George Ross to make the first American flag, adopted by the Continental Congress in 1777.

Carpenters' Hall, the meeting place of the First Continental Congress in 1774.

Old City Hall. The first Supreme Court of the United States convened here, 1791-1800.

Christ Church, founded in 1695, where Washington, Lafayette, Franklin, John Adams, Robert Morris and other great patriots worshipped. And Christ Church Burial Ground where you can see the graves of Benjamin Franklin and his wife, Deborah.

U. S. Custom House, built in 1819. Originally the home of the Second United States Bank.

The First Bank of the United States, erected in 1795, the oldest banking building in America.

Philadelphia's oldest Friends' Meeting House, built in 1804.

The Walnut Street Theater, oldest theater now standing in the United States, built in 1808, and still being used for stage plays.

The Old Pine Street Presbyterian Church (built in 1768), the only Presbyterian Church preserved from the Colonial period.

Old St. Joseph's Church, tucked away in Willings Alley and com-

pletely hidden by the growth of the city. This is the oldest Roman Catholic Parish in Philadelphia, the church originally having been built in 1733.

You also can travel to Valley Forge or walk the very streets where Washington fought the Red Coats during the Battle of Germantown.

Or visit the great old 18th Century mansions in Fairmount Park, or the Powell House on 3rd Street, or Elfreth's Alley—the oldest street in America.

You can have a look at another aspect of the Philadelphia Story in "Kitty Foyle's" home town of Kensington, one of the "70 villages" that grew together to make Philadelphia, where English weavers created (and have kept) a bit of London-away-from-home.

You can stroll through Washington Square and Rittenhouse Square, still distilling the air of turn-of-the-century elegance. And walk past the smart shops of Walnut and Chestnut Streets. You'll want to sample some of Philadelphia's own special foods – Reading Terminal ice cream (ice cream was invented here), scrapple, and pepperpot or snapper soup (with a dash of sherry).

It's a city of charm

You'll find Philadelphia a combination of charm and quaintness free from the frantic bustle that breeds ulcers elsewhere. But you'll be aware, too, that it is a renaissance city with a bold, visionary plan of city development as modern as any in the world—a plan which is restoring the irreplaceable shrines of our American heritage and at the same time wiping out urban blight and replacing it with the magnificent business structures of Penn Center.

The historic section of Philadelphia had, by the early 1940's, become a jungle of fire-trap buildings, parking lots, and run-down commercial establishments. Then the Independence Hall Association stimulated the city, state and federal governments into action which resulted in two major projects: The Independence Mall and Independence National Historical Park.

Will cost $20,000,000

Together they form the most important historical reclamation projects in the United States and when completed in a few years will have cost $20,000,000. All non-historical buildings in a seven block area are being demolished, to be replaced by landscaping, parks, fountains, statuary, and the restoration of all the historical buildings to their appearance of the period 1774-1800.

To carry out an authentic restoration of the buildings, to develop a landscaped pattern combining natural and man-made features in harmony with the historical scene, and to provide accurate historical information for visitors, historians have examined 2,000,000 manuscripts and records. More than 6,000,000 are yet to be studied.

And while this moving back of the clock nearly 200 years is going on, a mid-town business city for the future is rising in Penn Center, Philadelphia's answer to Radio City. Tree-dotted esplanades run between a group of glass and steel skyscrapers, giving the stroller the feeling of a promenade or of the old Regency parade. Fine examples of contemporary sculpture accent the open area and a large sunken

skating rink gives a sophisticated flavor to the scene.

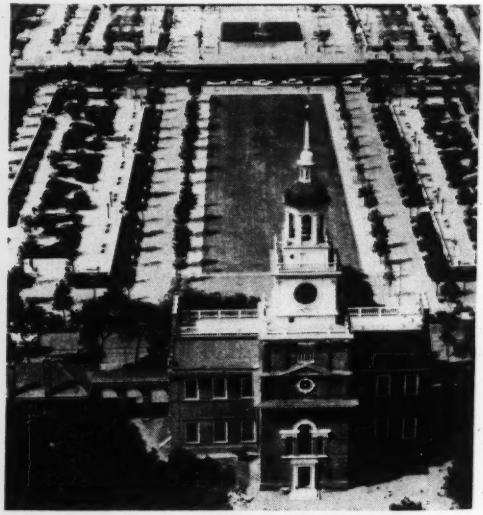
Below the surface of the street a concourse is being developed. This arcade, housing shops, restaurants and an equally spacious walking area, is expected to accommodate between 30,000 and 50,000 people a day. Open wells with staircases descend to the landscaped courts on the lower level.

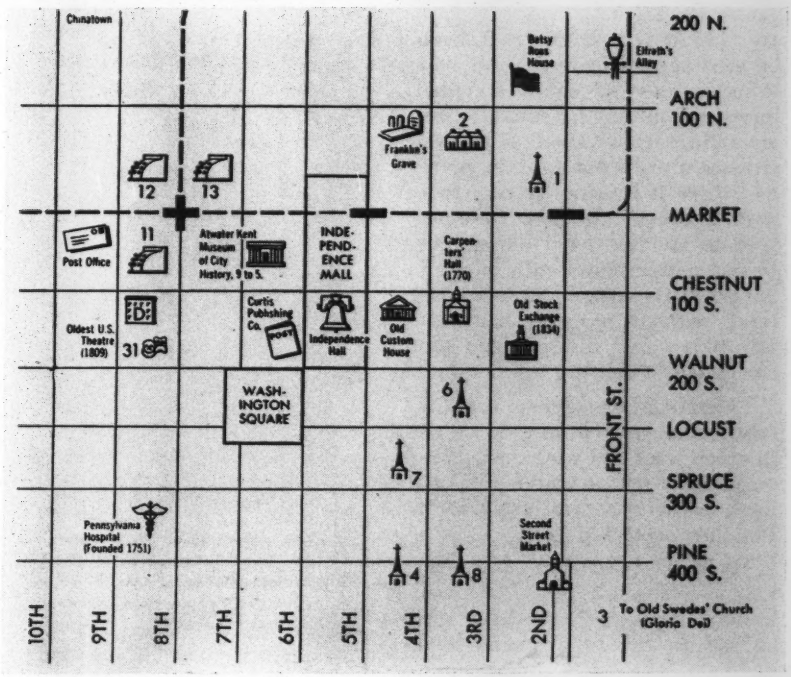
A new city of functional architecture has sprung to life in the heart of Philadelphia, the nation's third largest city and fastest-growing port.

Somewhat like Manhattan, most of Philadelphia lies between two rivers, the Schuylkill (pronounced SCHOOL-kill—the i as in habit) and the Delaware. Beyond the Dela-

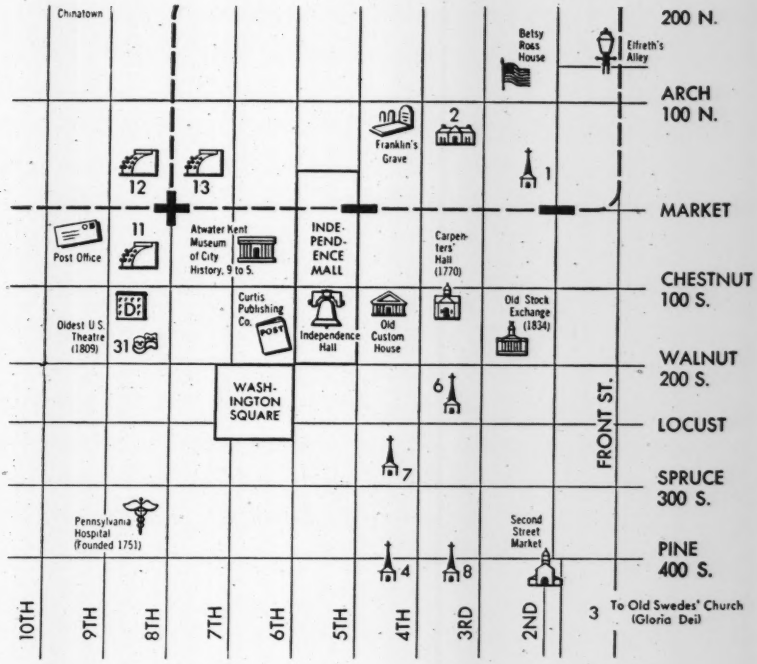
continued on page 32

Philadelphia combines the world of 1770 with that of tomorrow. Carpenters' Hall was where the First Continental Congress met in 1774. And the new buildings in Penn Center in downtown "green countrie towne" are as modern as any skyscraper city. In front of Independence Hall there now spreads a tree-spangled mall; an area for all Americans.





Our annual meeting headquarters —the Benjamin Franklin Hotel (building D on map)—is within walking distance of most of the historic sites of Philadelphia, such as the Betsy Ross House (right). Too, the hotel is handy to major churches and the large department stores. Keyed points of interest are: 1. Christ Church (1727)—2. Friends' Arch Street Meeting House (1804)—4. Pine Street Presbyterian (1768)—6. St. Joseph's (1838) on the site of the first Catholic church in Philadelphia—7. St. Mary's (1763)—8. St. Peter's (1761)—11. Gimbels—12. Strawbridge & Clothier —13. Lit Brothers—30. Walnut Street Theater. During the meeting one afternoon will be set aside for you to see the "Cradle of Liberty," and walking tour maps will be available for all.



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continued from page 13

are: (1) It is well tolerated, even by most apprehensive patients; (2) it fits any face, so that mask inventories and hunting for suitable sizes are reduced; (3) there is low resistance of valves at all three ports; (4) there is freedom to rearrange parts to convert the mask from one type to another—from rebreathing to non-rebreathing (with or without positive pressure), or to aerosol mask without reservoir bag; and (5) it is easily disassembled and cleaned.

There being no sponge, metal or fabric elements, cleaning is simple in green soap and water. After use on patients with infectious pulmonary conditions, we clean with Phisohex bactericidal soap.

To fit the mask, one judges the longness or fatness of the face, and merely bends the embedded wire so that the rim approximates these contours. The light, flexible structure of the device and the loose rubber lip at the rim provide snug fit around the edges. Easy pressure over the bridge of the nose leaves no mark even after an hour's use. Pressure at this point was previously unavoidable, and sometimes resulted in post-therapy sores.

Any nurse or therapist can most easily apply and use the technique; hence it has special value in hospitals too small for staff anesthesiologists. Use of this mask has reduced or eliminated our use of resuscitators, catheters, cannulas and tents in the recovery room. It has made higher oxygen concentrations possible. Patient comfort as well as virtual elimination of CO_2 rebreathing is such that even more protracted therapy where indicated is a possibility.

AMERICAN ASSOCIATION OF INHALATION THERAPISTS

THE AMERICAN ASSOCIATION OF INHALATION THERAPISTS is an organization of therapy technicians working: In hospitals, for firms providing emergency therapy service, and for municipal organizations. The Association is jointly sponsored by the American College of Chest Physicians and the American Society of Anesthesiologists.

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• We invite your attention to an important development in high-humidity, "fog-room" therapy for older children — a new concept in the treatment of upper respiratory congestion made possible by the new Walton Model HA Humidifier, which:

1. *Eliminates confinement of patients* (occuring when using infant type units for older children).
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Of special interest: Walton is instituting a national rental program on its room type models available to your patients through your local surgical or drug houses. We would be pleased to send rental information to you or to your dealer.

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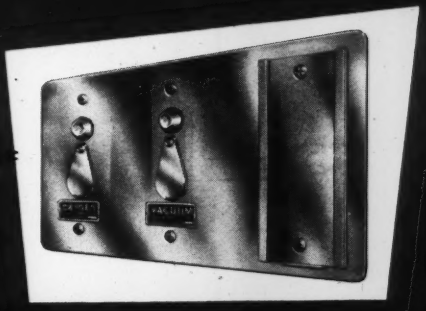

continued from page 15

the patient to use a nebulizer in a reasonable *p.r.n.* fashion without fear of complications.

Need for Less Cumbersome Apparatus. The other problem—that of possible need for aerosol (bronchodilating or detergent) in between regular treatments—pointed out the need for a new apparatus. It is obviously undesirable to allow patients to handle oxygen regulators or to turn oxygen flow on or off, both from the standpoint of safety and efficiency. It is likewise unreasonable to expect a nurse to be immediately available. Electric compressor pumps are easier to use, but unless the patient is in a private room, there are noise problems, especially at night. What was needed was a portable, quiet, efficient aerosol apparatus that could be used for a few inhalations or for a half hour of therapy at a time if necessary.

The solution to this problem is an apparatus based on the ordinary household propellant. It was introduced in 1958 by Beck[1] as a pocket-sized nebulizer for bronchodilator aerosols, and consists of a cartridge of dichloro-difluoro-methane (Halon), with a valve stem that fits into a plastic nebulizer. Doctor Beck demonstrated that this nebulizer (trade named Nebu-Halent) was easy to use, and an improved method of administering bronchodilators. But a larger apparatus was still needed for longer treatments.

A successful nebulizer for longer usage has been developed, based upon the original Nebu-Halent. This employs the same nebulizer unit mounted on a 16 oz. cartridge of Halon + methyl myristate in an insoluble capsule to stabilize the container temperature and permit of long term aerosolization. This one is called the Intermittent-Long-Term (I-L-T) Nebu-Halent.

The propelling gas, Halon (dichloro-difluoro-methane) is of extremely low toxicity, and no toxic reactions have been found when used properly as an aerosol propel-

Thomas J. Mahon, Inc.

lant. Studies have shown a concentration of Halon in the nasopharynx of 3.7 to 4.4%, while the oxygen percentage is 20.0 to 20.2. If the nebulizer is used improperly and higher concentrations are inhaled for periods of time, the patient may complain of dizziness or headache. However, this seems to be a transient effect, soon relieved; and blood, kidney and liver function studies on patients using this nebulizer for several weeks failed to show any signs of toxicity. Animals kept in much higher concentrations of dichloro-difluoro-methane likewise showed no evidence of toxic changes at autopsy, nor was any

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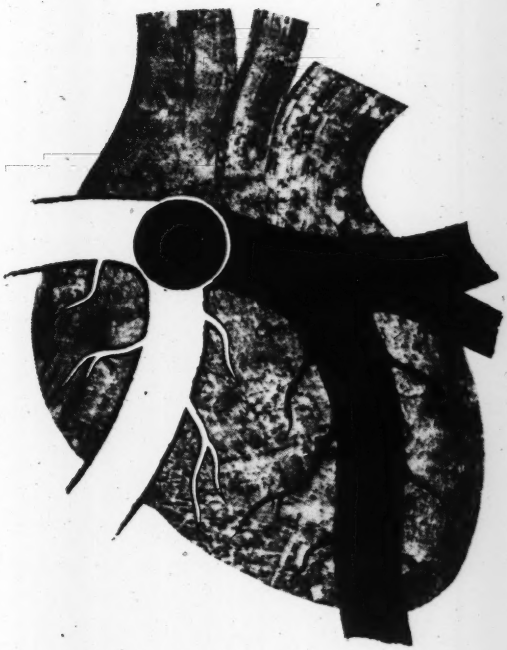

"The use of oxygen in myocardial infarction is no longer a desperate or heroic measure. The principle of rest for the heart would require that oxygen be used for the patient who is cyanotic, dyspneic, in shock, in pulmonary congestion or edema, or suffering from a cardiac arhythmia with rapid heart action. Persisting pain of myocardial infarction may be relieved or reduced by oxygen therapy. In other cases, use of oxygen may well be justified for the first day or two in an attempt to prevent gross anoxia and to compensate for less overt degrees of oxygen deficiency."

—*Early Management of Myocardial Infarction:* B. E. Pollock; Journal of the American Medical Association, 161:404 (June) 1956.

YOU CAN RELY ON OXYGEN U.S.P. BY

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continued from page 24
cell damage seen in histological sections.

The I-L-T nebulizer should be used with the spout held at least two inches in front of the open mouth. This position, so often described for aerosol therapy, permits the fog to mix well with inspired air. Less impinges on the tongue, cheeks and pharynx, with more reaching the bronchi. If the spout is placed in or close to the mouth, a larger percentage of droplets remain in the mouth, thus decreasing the efficiency of the treatment. Generally one cannot tell, without actual observation, whether or not a patient is using a nebulizer correctly. With this apparatus, incorrect usage is likely to cause dizziness and this symptom can be used to determine that the patient is not actually receiving adequate and proper aerosol treatment, due to improper technique.

The simplicity and portability of the I-L-T nebulizer permits great enhancement of aerosol therapy, adding to the regular schedule of treatments aerosol as indicated by the individual symptoms of the particular patient.

Cases with Diffuse Bronchial Obstruction. Asthma, asthmatic bronchitis, emphysema are treated on our service by IPPB, using 0.5 cc Nebu-Prel and 2 cc Tergemist, or by the same mixture in a nebulizer, three or four times a day. We have found that if bronchospasm occurs between treatments, retention of secretion is greater and the subsequent treatment is less effective. On the other hand, when the patient is given one of these Halon-driven nebulizers and Nebu-Prel, with instructions to use this if wheezing occurs, drainage is much better and improvement more rapid.

In the patient with severe bronchial irritation and frequent episodes of spasmodic cough, we give Tergemist for half an hour three or four times a day, preceded each time by five or six inhalations of Nebu-Prel. The aerosol soothes the irritated tracheo-bronchial mucous membrane. In bad cases, particularly early in the disease, more frequent treatment is necessary especially during cough spasms. But it is not necessary to use the bronchodilator more often than the schedule above. The patient should be permitted to take a Tergemist aerosol treatment whenever cough spasms occur. If oxygen can be used, this is of course routine, but (as stated above) very frequent use requiring the patient to handle all the apparatus himself is not always desirable. In such cases, the I-L-T nebulizer can be left at the bedside or carried around by the patient, who can use it at any time or place, with no trouble to anyone.

When treatment is taken frequently, improvement occurs earlier. The earliest improvement is not in the severity of the cough spasm, which may be unchanged, but in a lengthening period of relief between episodes. The free periods become longer and longer, but cough may occur with any tracheal irritation, dyspnea, laughing or any activity associated with quick, gasping type of inspiration. Such an episode may occur at night, waking the patient, who may then reach out to the bedside stand for his I-L-T nebulizer already prepared with detergent, and start aerosol treatment immediately and without disturbing anyone else.

concluded on page 28

now . . . for the first time . . .
two new oxygen-tent units that are **easy to wash!**

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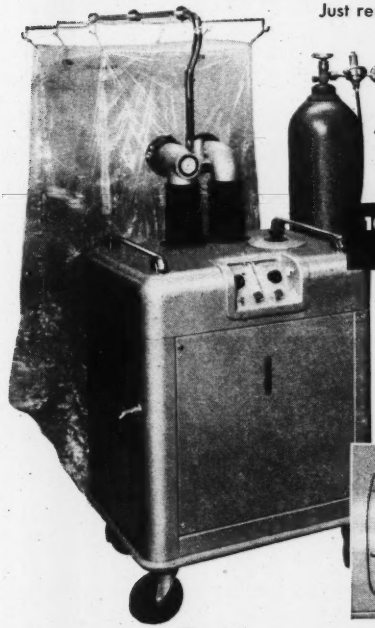


Just remove door on top. Then wash the coils with hose or large volume of water!

Don't worry! Large-diameter drains mean quick removal of wash-water.

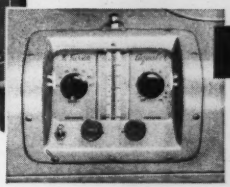
A great convenience to service personnel.

Only McKesson Aqualors have this feature!

100% HUMIDITY MAINTAINED BY THIS MODEL 1150!

Nebulizer is located in bellows-tube connection. Easily removed by service personnel.

STANDARD AQUALOR (Model 1155) is identical to Model 1150, except for High-Humidity feature.



Lighted Control Panel

note oxygen flowmeter (center), temperature and ventilation controls (left and right), oxygen controls (bottom).

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continued from page 26

When the patient leaves the hospital, there is no question but that further aerosol therapy is beneficial. The easiest and most certain method is for him to take the propellant cartridge nebulizer home with him and continue treatments 15 to 20 minutes each, three times a day. With this portable nebulizer, this can be done while watching television, sitting on the porch, or if the necessity arises, at night without getting out of bed.

Since this aerosol is directed at the mucosa of the tracheobronchial tree (not deep into the lung), ordinary quiet breathing is all that is necessary, and in fact is much more efficacious. The patient breathing easily, activating the nebulizer only during inspiration, will nebulize 4 to 5 cc of detergent in the 15-20 minute period. If this is carried out three times a day, a single cartridge will last from five to seven days before it is completely empty.

When a patient requires aerosol therapy, he also needs adequately humidified air in between times; otherwise, the laryngo-tracheo-bronchial mucosa becomes irritated by the dry air. The atmosphere should be maintained at a minimum relative humidity of 35%, and proper apparatus should be used if necessary to insure this.

There are further advantages to portable aerosol therapy. In addition to post-hospital treatment, there can be pre-hospital treatment. Such cases may be pre-operative patients with severe chronic coughs, asthma or emphysema, who might receive antibiotics added to detergents to decrease the chance of post-operative complications. Patients who come in daily or at intervals for IPPB treatments can use the I-L-T with Nebu-Prel and Tergemist at home, since therapy on arising and retiring is so important.

In addition, there are many people who can be treated entirely at home if aerosol therapy is started early enough. The advent of this portable propellant-cartridge apparatus makes this practical and should permit a wider use of this obviously helpful therapy.

REFERENCE

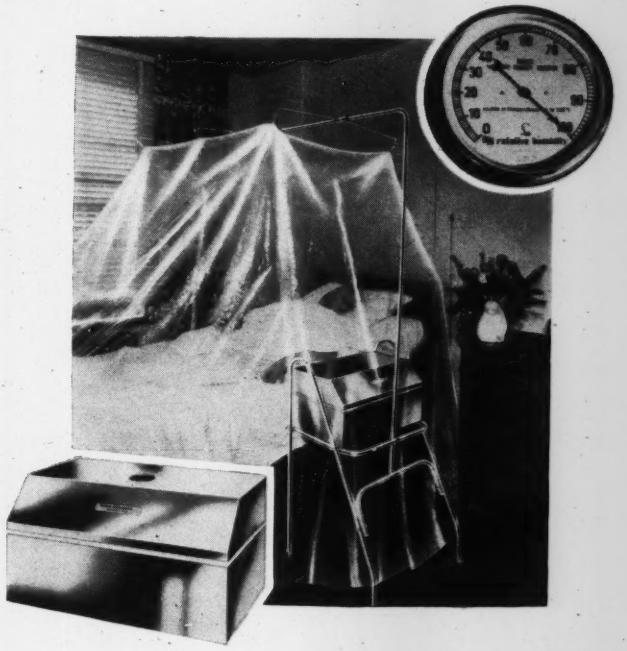
"A New and Effective Method of Nebulizing Bronchodilator Aerosols: Clinical and Physiological Effects," by Gustav J. Beck, M.D., in **Diseases of the Chest, 33**:607 (1958).

AAIT CHAPTERS

The American Association of Inhalation Therapists now has 17 chapters, the most in its history. Here they are with their headquarters city:

CHAPTER	CITY
Bay County (Michigan)	Bay City
Boston	Boston
Connecticut	New Haven
Delaware Valley	Wilmington
Florida	Miami
Greater Montreal	Montreal
Greater New York	New York City
Illinois	Chicago
Michigan	Ann Arbor
Ohio	Cleveland
Southeast Texas	Port Arthur
Southern California	Covina
Southern Ontario	Toronto
South Texas	Houston
Tennessee	Nashville
Upper Midwest	Minneapolis
Western New York	Buffalo

Additional chapters are being formed.



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Model 100

Check these OUTSTANDING FEATURES:

- Produces "Cold Vapor" for alleviation of upper respiratory congestion.
- 100% humidity in minutes with full over bed canopy.
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Examining new oxygen tent model at Michigan's first annual institute and workshop on inhalation therapy are AAIT President Don E. Gilbert, Theron E. Andridge, and Albert H. Andrews, Jr., M.D., workshop luncheon speaker.

CHAPTER ACTIVITIES

by Jack Sangster

THE Michigan Society of Inhalation Therapists and the Bay County Chapter were co-sponsors of Michigan's first Annual Institute and Workshop on Inhalation Therapy in Battle Creek with more than 90 attending.

Albert H. Andrews, Jr., M.D., director of the respiratory laboratory at St. Luke's Hospital, Chicago, and a member of the board of advisors of the AAIT, was the luncheon speaker. He attributed increased public interest in inhalation therapy to the continued emphasis we are placing on good techniques. But he cautioned that *improperly managed* inhalation therapy "is the greatest fraud today in medical activities."

AAIT President Don E. Gilbert, University Hospital, Ann Arbor, moderated the morning session, and Jerome Heydenberk, Bronson Methodist Hospital, Kalamazoo, president of the Michigan Society of Inhalation Therapists, presided in the afternoon.

Roundtable discussions and workshops were held on: Organization and advantages of inhalation therapy departments, selection of equipment, medical supervision, regulators and pipelines, and resuscitators and emergency equipment.

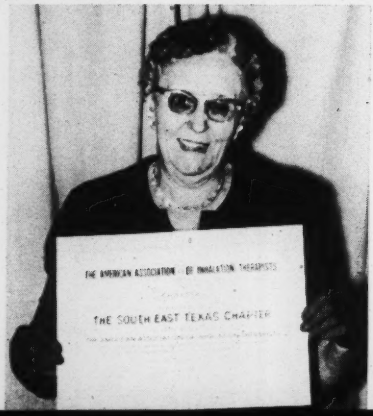
With the granting of a charter to the **Southeast Texas Chapter** at Port Arthur, the second biggest state now joins Michigan and New York as the only ones having two chapters. The **South Texas Chapter** is at Houston.

The charter was presented to Mrs. Montry M. Eason, oxygen therapist at St. Mary's Hospital, Port Arthur, by Dr. Stewart Wilber, anesthesiologist, M. D. Anderson Hospital, Houston. Mrs. Eason is the chapter's first president.

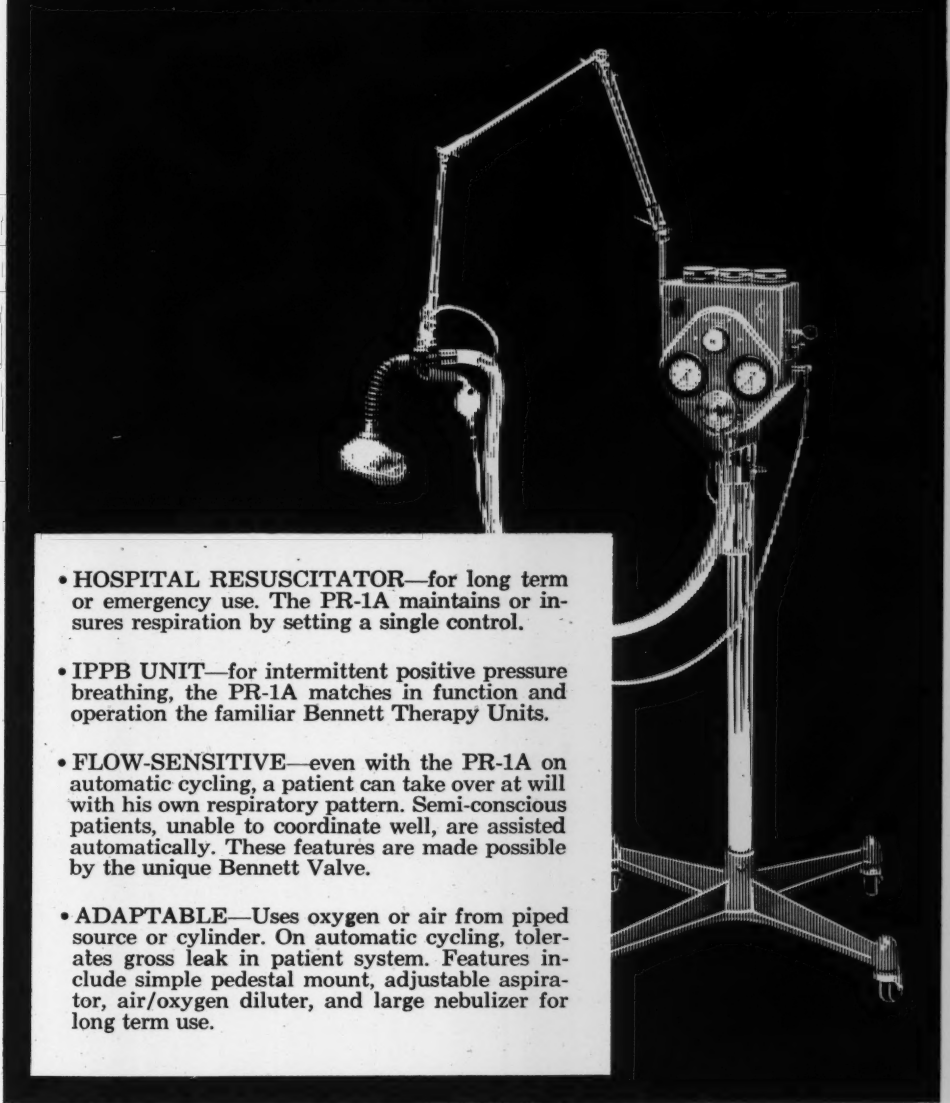
Other officers are: Mrs. Harriet T. Robin, licensed vocational nurse, St. Mary's Hospital, first vice president; Mrs. Lucille M. Pittman, R.N., Doctors' Hospital, Groves, second vice president; and Mrs. Ruth L. Carnahan, licensed vocational nurse, St. Mary's Hospital, treasurer.

Board members, besides the officers, are: Mrs. Maxine Moore, Miss Florence Junot, and Mrs. Bessie I. Bradford, all of St. Mary's Hospital.

Mrs. Montry M. Eason of St. Mary's Hospital, Port Arthur, first president of the new Southeast Texas Chapter, with the chapter charter.



BENNETT MODEL PR-1A RESPIRATOR



- HOSPITAL RESUSCITATOR—for long term or emergency use. The PR-1A maintains or insures respiration by setting a single control.
- IPPB UNIT—for intermittent positive pressure breathing, the PR-1A matches in function and operation the familiar Bennett Therapy Units.
- FLOW-SENSITIVE—even with the PR-1A on automatic cycling, a patient can take over at will with his own respiratory pattern. Semi-conscious patients, unable to coordinate well, are assisted automatically. These features are made possible by the unique Bennett Valve.
- ADAPTABLE—Uses oxygen or air from piped source or cylinder. On automatic cycling, tolerates gross leak in patient system. Features include simple pedestal mount, adjustable aspirator, air/oxygen diluter, and large nebulizer for long term use.

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continued from page 18

ware is New Jersey; beyond the Schuylkill is West Philadelphia and the Main Line . . . so called because the estates and settlements there straddle the main line of the Pennsylvania Railroad to Pittsburgh.

Center City is easy to get around in because of the formal pattern in which William Penn laid out his "green countrie towne." The principal east-west streets have names mostly of trees (Chestnut, Walnut, Locust, Spruce, Pine, Filbert) while the main north-south streets have numbers, all save one—Broad Street which should by rights be 14th Street.

Broad is the main north-south street and Market the main east-west street, with the numbers running north and south from Market.

Our hotel—the Benjamin Franklin—is at the corner of 9th and Chestnut, just a five minute walk from such places as Independence Hall and Carpenters' Hall, Washington Square, Franklin's grave, the Atwater Kent Museum, the home of the Saturday Evening Post; and is just across the street from Gimbels, and a block from Strawbridge & Clothier and Lit Brothers.

With the attractions of Philadelphia, the continuing mushroom growth of the AAIT in members and chapters (see Editorial, page 10), and the fact that the "city of brotherly love" is more centrally located to our membership than last year's meeting place, we expect more than 300 people to attend the Fifth Annual Meeting and Lecture Series.

New **EMERSON EXHALATOR** *with IPPB*

Gentle pressure over the abdomen aids exhalation, after the patient completes each inspiration. The Compressor of the Emerson Assistor handles both phases easily, or the Exhalator Attachment can be used on oxygen models.

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EDITOR'S CORNER

A Two-Headed Problem

WE HAVE wanted formal education and we have wanted a registry. Both of these now are materializing, but a largely unsolved problem which rears its two ugly heads is (1) where are we going to get students who can support themselves while they're attending school, and (2) what assurance of lucrative placement can these prospective therapists be offered as an inducement?

Some folk reply: "Where do college students get *their* tuition money?" It hardly seems worth taking space to observe that college students expect to step into jobs that will pay them two to four times as much as the average therapist will earn even *after* formal schooling!

I am much more optimistic about the answer to the second question, as I know there are hospitals that would like to set up departments when they feel they can have them staffed by *professionals,* and our good doctors are becoming more and more demanding about *quality* inhalation therapy; so this is not a situation that is on the wane — the need will increase.

A short course needed

Eventually, if we are to compare with other paramedical specialists, our formal schooling will have to cover two years, but for the immediate present, this is possibly more than many of us can manage. Just going from *no* formal education to a nine- or 12-months' course is a very significant advance, and while this will not ultimately suffice, it might for the time being pose fewer problems than longer courses will.

Even if no tuition is charged, the student still loses income and has to maintain himself. No wonder the prospective therapist asks: "Do I attend school for a year to get a job that starts at $1.25 an hour? The nearest super market pays $1.70 an hour just for stocking shelves, without spending any time in school first!"

More income elsewhere

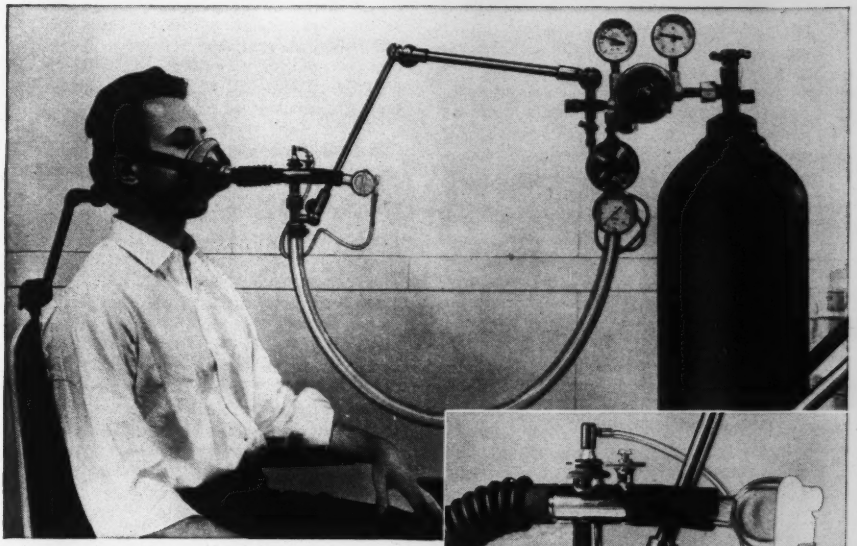
Now I know it bothers many to see actual figures stated (and these *are* actual), and I know the usual answer is that inhalation therapy is more interesting and/or more "rewarding." To this I'm sure we all agree, but there comes a point beyond which this big income differential makes that answer extremely feeble, and a man cannot support his family on "rewarding experiences."

Since vocational guidance counselors aren't going to suggest inhalation therapy until it is financially more inviting, the greatest source of registrants for schools is persons already engaged in this work. But these people are in no position to stop work for a whole year to attend school—even if they pay no tuition!

Neither do budget-bound or unconvinced administrators feel that there is enough future in inhalation therapy to warrant *their* gambling funds in subsidizing these students or the school itself.

In spite of these really knotty problems, five or six schools already are operating and others are being planned. We are hoping in a future issue to review them; their names, locations, curricula, tuitions, etc., to let you know what already is being done.

For the efficient and simplified administration of I. P. P. B. I. therapy . . . the improved M-S-A Pulmonary Ventilator . . . mobile or cylinder model



The M-S-A Pulmonary Ventilator provides effective pressure breathing therapy in combination with aerosol therapy.

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Note: the new M-S-A Pulmonary Ventilator provides both dilution and 100% oxygen. It is sold only on the prescription of a licensed physician or on the order of properly qualified hospitals and other institutions.

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WORTH NOTING

"Considerations in Humidification by Nebulization," by Ivan E. Cushing, M.D. and William F. Miller, M.D., in *Diseases of the Chest,* 34:4, 1958.

This comprehensive article treats terminology of humidity, the need for humidification, the distinction between vapor humidity and liquid humidity (i.e., amount actually suspended in air in droplet form), and the way each is affected by changes in temperature and other factors such as nebulizer design and nature of nebulized fluid, etc. Another interesting aspect discussed is the matter of concentration of solutes in a solution as it is nebulized, which depends on the ratio of solute-free vapor produced to the solute-containing droplets produced.

Extensive testing of large and small nebulizers was done, and much emphasis placed on the increased humidity obtained by raising the temperature. In fact, they concluded that, "to assure significant deposition of pure water in the lower airways, the operating temperature of most nebulizers must be raised by some form of heating."

There is a special section on humidification for IPPB, in which the authors assert that present side-stream devices are inadequate for the volume of gas to be moistened. They recommend the use of a mainstream type of aerosol generator—i.e., one through which the entire output of the IPPB must flow, thus humidifying all the gas instead of only a small fraction. The side-stream nebulizer would then be used only for addition of medications. Maximum humidification is obtained by using a heated aerosol generator for the mainstream position.

"How Many Oxygen Outlets are Enough?" by John D. Thompson, in *Modern Hospital,* January 1959.

This author takes issue with hospital planners who would install an oxygen outlet at each patient's bedside, and bases his contention that this is not necessary on a careful study of the amount of usage of such outlets on the obstetric, medical and surgical services in a large teaching hospital in northeastern U.S. over the course of a year.

As might be expected, he found that practically nobody on obstetrics needed it, and that the surgical floors used it much less than the medical floors—in a ratio of about 1:4. It was of interest to note, incidentally, that in that particular "large teaching" hospital, of a year's total of 591 inhalation therapy cases, 343 were tent patients and 116 were in face tents, the other modalities really hardly being used—especially the nasal catheter: only seven cases out of 591!

"Medical Problems Involved in Underwater Compression and Decompression," by Captain Gerald J. Duffner, MC, USN, in Ciba *Clinical Symposia,* July-August 1958.

With the increasing numbers of skin-diving enthusiasts and SCUBA (Self-Contained Underwater Breathing Apparatus) users, more of us may have occasion this summer to deal with the problems posed by the use of this type of equipment. Captain Duffner's paper deals with the physical laws involved in underwater breathing, and problems of increasing compression during descent, those encountered at the bottom, and those during ascent or decompression. He explains the difficulties occurring in the ears and sinuses when pressures are not equalized between them and the surroundings. Also he tells of collapse or rupture of the lungs if the proper measures are not taken. Aero-embolism, or "bends," is discussed, as is "squeeze," a term used to describe the effect of generalized pressure on the body.

"In the diver equipped with a helmet ('hard-hat' diving), the pressure of air within the helmet must be maintained at the pressure of the water outside; otherwise the entire body will tend to be compressed into the helmet," he says. Also, if pressures are unequal inside the helmet or goggles, negative pressure can cause blood vessel damage, particularly noticeable in the eyes.

The paper warns about oxygen poisoning and about nitrogen narcosis, explaining the causes and manifestations of each, and gives a table which shows the "safe" lengths of time or depths to which one may go without facing these difficulties.

This table and the other illustrations by Dr. Frank H. Netter help make it a very understandable and informative presentation. **—J.F.W.**

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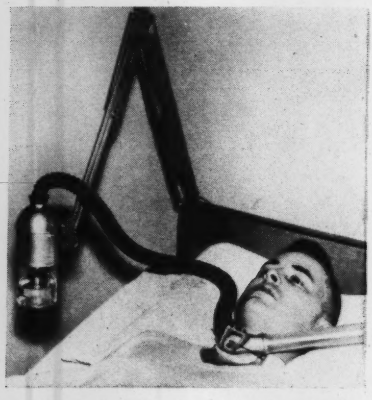
EQUIPMENT NEWS

(Information and photographs supplied by the manufacturers or distributors).

New Flexible Arm Unit

The Mist-O_2-Gen Equipment Company of Oakland, California has introduced a flexible arm unit on which any of its aerosol generators can be mounted, for use with face or tracheotomy masks (latter illustrated here).

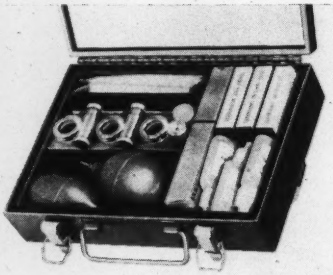


Called the Flex-O_2-Mist, this floating equipoise arm is internally threaded with tubing which can be connected to either oxygen or air sources for operation of the aerosol generator. When using the Tepid Mist nebulizer, the electric cord for the heater also can be run along the arm in a convenient out-of-the-way manner. The end of the arm is fitted with a universal bracket which can be clamped in either vertical or horizontal position on beds, bedside tables or the handy roll-around stand available as accessory equipment. The stand supports an air compressor.

Also illustrated here is the Trach-O_2-Mist mask for aerosol therapy via tracheostomy. The mask has a lucite window which can be displaced to facilitate suctioning without removal. Another feature is the exhaust tube, which prevents introduction of room air except in case of failure of the oxygen or air source driving the nebulizer. **No. 421**

CO Poisoning Test Kit

The extent of carbon monoxide poisoning can be determined in two quick ways with a new Carbon Monoxide (CO) Poisoning Test Kit developed by Mine Safety Appliances Company, Pittsburgh. The kit tests either exhaled air or a blood sample. A color change may be produced in a tube of silica gel impregnated with a yellow complex silicomolybdate compound and catalyzed with palladium sulfate. The color change is compared with a color chart and the per cent of CO in the blood is read from a conversion table.



An exhaled air sample shows the amount of carbon monoxide in the blood in less than a minute. A blood sample, taken when the patient is unconscious, will show the per cent of CO in the blood in less than five minutes.

The equipment, including balloons for samples, aspirating bulb, reagents, indicating tubes, blood sampling components, and accessories, fits in a carrying case. **No. 422**

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. . . can be obtained by mailing this coupon to "Inhalation Therapy," Room 904, 332 So. Michigan Ave., Chicago 4, Ill.

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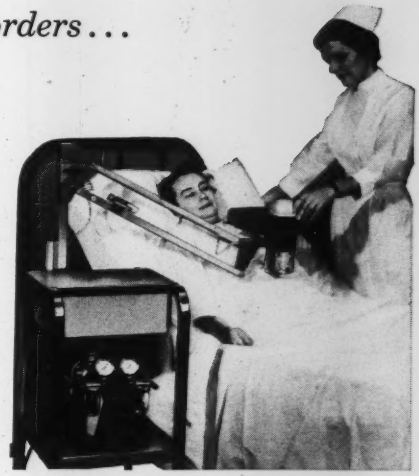

HYDROJETTE provides cool vapor in therapeutic particle sizes to hydrate upper respiratory tract.

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